AP Environmental Science
2023-2024 Summer Assignments

Welcome to AP Environmental Science! The major topics of the class we will be covering this year are as follows:
*Must be turned in by the first day of class (hard copies of poster and options for other items to be digital or hard copies; all items must be uploaded to google classroom)

- The Living World: Ecosystems
- The Living World - Biodiversity
- Populations
- Earth's Systems and Resources
- Land and Water Use
- Energy Resources and Consumption
- Atmospheric Pollution
- Aquatic and Terrestrial Pollution
- Global Change

WE GO THROUGH THE CONTENT OF THE ENTIRE TEXTBOOK AND BARRONS!!! It is my job to make sure you all have the opportunity to do well on the AP TEST. Rise to the bar, I will not lower it for you.

The summer assignment will give you a brief overview of the topics listed above as well as a few specific skills, processes and terminology which give students trouble throughout the year. Over the course of the year we will learn more about the science and social issues associated with each of these topics and their impact on the environment. All assignments will be due when you come back the first day of class. If you have any questions about any of the assignments, feel free to email me at **dchristensen@jacksonsd.org.** The summer work will count as one large assignment towards your first marking period grade. You can hand write AND/OR type in any combination as long as you are answering and completing all aspects of assignments.

The assignments will be graded as follows:

1.) Lorax Movie

Watch *The Lorax* movie (cartoon) and answer the questions that go along with the movie within this packet
20 Points

2.) Documentaries

Choose any TWO documentaries (video must be 30 minutes in length to be accepted) in the list provided that look at environmental issues (not just nature). See below for further details.
20 Points Each or 40 Points Total

3.) Field Guide

must go outside, find and identify 18 species. Use the list and directions below
20 points

4.) Biogeochemical Cycles

Complete the biogeochemical assignment as described in the directions below
20 points

Total: 100 pts

As a disclaimer there will be vocab quizzes during the first week of each unit where you will be responsible for knowing the vocab words from the respective chapters before we start the lectures (therefore we can have productive discussion). On the quizzes I will provide definitions and or examples and you will need to fill in the blanks based on bolded words in the textbook (without a word bank) If you want to start studying for or making flashcards/a document for the first unit. This is not an official assignment however I am letting you know how to better prepare if you would like. This course is designed to challenge you in order to best prepare you for the required AP test at the end of the year where you may earn college credit!

The Lorax Movie

Name:

APES The Lorax Summer Worksheet

Ctrl-Click the following url for: The Lorax Movie
https://www.youtube.com/watch?v=8V06ZOQuook

1.) Describe or identify who you believe the Lorax is throughout the video

2.) Describe or identify who you believe the Once-ler is throughout the video.

3.) Name the natural resource the Once-ler identified.

4.) Name and describe the Once-ler's product:

5.) Observe how the Thneed factory changed over time; describe how the factory changed as the business grew.

6.) What technology did the Once-ler invent to increase the production of Thneeds?

7.) How did the Thneed industry affect the physical environment overall (water, air, soil, etc.)

8.) Byproducts are materials or chemicals remaining after the production of a product.
    a.) Name and describe two byproducts that resulted from making thneeds.

b.) Were the byproducts that resulted from making of Thneeds harmful or helpful to the environment?

c.) Were any animals affected by the byproducts of Thneed production? If so, how were they affected?

9.) Compare the environment in the beginning of movie before Once-ler arrives to the environment that exists many years after Thneed production has ended. Why hasn't the environment returned to a pre-Thneed state?

10.) What lesson(s) do you think the Once-ler learned?

11.) What do you think was meant by the 'unless' quote?

12.) Identify/Describe something this reminds you of in your life/our world.

Documentaries (pick 2)

YOU NEED TO SELECT 2...Documentaries must be a minimum of 30 minutes in length. Documentaries should look at Environmental Issues, not just nature. Please complete the following for each documentary:

1.) Provide the name of the documentary and year in which it was released.

2.) Describe any questions you may have as a result of your viewing (3 Questions Minimum).

3.) Describe your opinion of the documentary - positive/negative/neutral. Reference items in the documentary to support your thoughts (Minimum 1 paragraph)

4.) Relate what you have learned to your personal life - how does it affect/impact you? What information affected you the most? Will it impact how you live your life? (Minimum 1 paragraph)

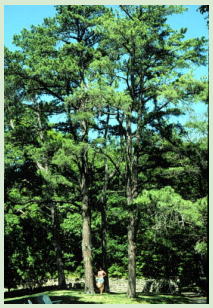
Suggested Documentaries - many can be found on Netflix, Amazon Instant Video, and most can be streamed straight through your computer using Youtube by putting in the key words from the list below:

- Blackfish
- National Geographic: Human Footprint
- National Geographic: Six Degrees Could Change the World
- 180° South
- Flow: For the Love of Water
- Tapped
- Trashed
- Food, Inc.
- King Corn
- Dirt
- Gasland
- Who Killed the Electric Car/ Revenge of the Electric Car
- Manufactured Landscapes
- Rotten (episodes)
- Cowspiracy
- My Octopus Teacher
- Seaspiracy
- Vanishing of the Bees
- Before the Flood
- After The Spill
- More than Honey
- Inconvenient Truth: The Sequel or original
- Chasing Coral
- Chasing Ice
- Little Big Farm
- A fierce Green Fire
- Mission Blue
- Explained (netfix Episodes: Why women are paid less, world water crisis, The future of meat or animal intelligence)
- Fresh
- Fuel
- Bag In
- Blue Gold: World Water Wars
- Plastic Planet
- World in Balance: The Population Paradox
- Planet in Peril
- Empty Oceans, Empty Nets (PBS)
- Harvest of Fear (Frontline)
- The Cove
- Hawaii: Message in the Waves
- Cane Toads: An Unnatural History
- Carbon Nation

*If there are any which you feel are similar or of more interest to you and would like to view, please contact me to have it approved first. If you have seen the documentary in the past, please VIEW IT AGAIN to complete the assignment

Field Guide

It is important to be able to identify species properly, but it is a difficult skill to learn. Some of the major species in the area must be recognized in order to do certain field and lab tasks. Building skills and seeking tools in identifying the species is just as important as knowing some of these species. You must create tables for plants (9) and animals (9). Identify some of the species that I have provided and use your environment (any environment, beach, bay, forest, backyard, park) to find the additional species. There are free plant identification apps in which you can use as well as websites. Before the internet, scientists had to keep the specimen and use field guide books to identify organisms. Now you can take pictures and utilize the internet to identify them properly. PICTURES MUST BE YOUR OWN/WHAT YOU OBSERVE (not from google). Keep note of the sites and apps that you liked best.

Directions:				
Common Name	Scientific Name	Description	Location	Picture
Identify the common name of the species, there may be more than one *MUST be a SPECIFIC SPECIES	Identify and properly write the scientific name (italic)	Describe the organism. If animal: may use call, coloration,behavior, flight pattern, or remnants left behind (tracks, nest, fecal material etc) If describing plant: leaf shape, bark, overall shape of plant, height. Identify if native to area	These descriptions must be in real time. The data you gather may be jotted down and finalized later after doing research. Here describe: where, when, type of habitat, current weather	Take a picture of organism (use your cell phone) do not use a google image. This is evidence which you can refer to later to ensure your naming is correct or to view variations within species/specimens.
Plant Example				
Pitch Pine	*Pinus rigida*	-stiff and slightly curved needles -3 needles per fascicle -needles twisted and roughly 10 cm long -dark green color, with new growth -Short stubby cones -Needles on ground	Cattus Island, 13:45 July 7 2018, Upland marsh environment, partly cloudy, soil slightly moist (slightly acidic), surrounded by others of the same type and shorter foliage, ground	

		around tree -Bark light brown with deep fissures Native to area	covered in needles and moss	 
Animal Example				
Red Winged Blackbird	*Agelaius phoeniceus*	-Seen flying between marsh grass stalks -Quick maneuverable flight -Distinct 'Conk-a-ree' call observed -at least 2 others of the same species observed at same location, additional passerine birds also observed -Native to area	Stockton University (near lake), 16:30, July 8 2018, Tidally influenced lake in the Pine Barrens, Weather sunny, windy and dry. Water temperature 18 degrees C.	

Please complete/find for the following plants as they are important to our local environment:
-*Pinus rigida*
-*Quercus rubra*
-*Quercus alba*
-*Phragmites australis*
-*vaccinium corymbosum*
-*Chamaecyparis thyoides*
-3 additional plants

The following animals:
-at least 1 insects
-at least 4 birds
-4 additional animals (can be any type, crab, fish, mammal, bird, insect)

Biogeochemical Cycles

BACKGROUND INFORMATION:

*These cycles are complicated but they are referenced throughout the year, so encountering the cycles before starting the course is essential

Any substance an organism needs in order to live, grow, or reproduce is called a nutrient. Some elements (such as carbon, nitrogen, sulfur, oxygen, and phosphorus), called macronutrients, are needed in fairly large amounts. These nutrient substances are continuously cycled from the abiotic environment to the biotic environment and then back again in what are called **biogeochemical cycles**. They are driven directly or indirectly by incoming solar energy and gravity. These cycles have been continually changing over the past thousands to millions of years. However, man has now interfered and changes in these cycles have taken place over only tens to hundreds of years. The following are a small list of human influenced changes:
depletion of chemicals in biogeochemical reservoirs (atmosphere, hydrosphere, and lithosphere),
buildup of other chemicals in these reservoirs (heavy metals in our water systems, toxic gases in our atmosphere), and changes in chemical cycling rates. Ecologists are working to find answers to these problems.

Because the earth is essentially a closed system, the planet's chemical cycles are vital for all life, and they explain why without death there could be no life. The cycle of reproduction, growth, death, and decay of organisms keeps renewing the chemicals that support life. The earth's chemical cycles also connect past, present, and future forms of life. Some of the carbon atoms in your skin may once have been part of a leaf, a dinosaur's skin, or a layer of limestone rock. Some of the oxygen molecules you just inhaled may have been inhaled by your grandmother, by Plato, or by a hunter-gatherer who lived 25,000 years ago.

ASSIGNMENT:
The following activity will help you understand the process as well as the importance of each biogeochemical cycle. Read the information concerning the four biogeochemical cycles; carbon, phosphorus, sulfur, and nitrogen in your text. In addition to your textbook you may use other websites you find during your research to complete the assignment.

1. POSTER: After reading about the cycles you will create a poster including the 4 major cycles. (Carbon, phosphorus, sulfur, and nitrogen). You may draw the 4 cycles in separate sections on the poster or you may combine them in one picture if done neatly and clearly. You have the option to draw each of them on a piece of computer paper, however they must be neat, detailed and colorful. Items should be clearly labeled – but please be creative! The poster should be completed as described below, but CANNOT include printouts or exact copies of diagrams already found in print or online:

a. Where appropriate include chemical compounds or reactions involved in the cycle
b. Identify inorganic and organic reservoirs for the element (where is this element stored throughout the cycle.
c. In addition to the above content, posters should be visually pleasing including color, illustrations, and any other items you would like to use. For example, you may want to use cotton balls to represent clouds. You can color them gray to show the pollutants released when fossil fuels (carbon) are burned.

2. ADDITIONAL INFORMATION:

a. On the back of your poster, answer the following questions about your assigned cycles. You can write or print on separate paper. These must be answered using APES level writing, and complete sentences:

i. Carbon cycle:

1. What 4 organic compounds is carbon found in?
2. Carbon dioxide comprises approximately what percent of tropospheric gases?
3. How is the relative amount (%) of CO_2 significant in contributing to the Earth's "natural thermostat"?
4. Identify the two processes which have the greatest influence on tropospheric concentrations of CO_2 on a monthly or yearly basis.
5. Name the two largest sinks (storage areas) for carbon.
6. Discuss how oceans play a major role in regulating CO_2 levels in the trophosphere
7. Describe the two major anthropogenic interventions in the carbon cycle

ii. Nitrogen Cycle:

1. What 2 organic compounds is nitrogen found in?
2. Identify the two major ways that nitrogen is “fixed”
3. Describe what takes place in each of the following processes or steps of the nitrogen cycle (include a description of the events and chemical transformations in each step):

a. Nitrogen fixation
b. Nitrification
c. Ammonification
d. Denitrification

4. Describe two anthropogenic interventions in the nitrogen cycle

iii. Phosphorus cycle:

1. Which organic compound is phosphorus found in?
2. Explain why phosphorus does not circulate in the troposphere to a great extent
3. Identify the largest sinks for phosphorus
4. Phosphorus is typically found in what ionic form?
5. Explain why the addition of phosphate compounds to aquatic areas typically has a dramatic effect on biological productivity
6. Comment on how human activities have influence the phosphorus cycle regarding each of the following:

a. Mining phosphate rock
b. Animal waste from livestock feedlots
c. Commercial phosphate fertilizers in agricultural areas
d. Discharge of municipal sewage/water treatment facilities

iv. Sulfur cycle

1. Which organic compound is sulfur found in?
2. Identify the two largest storage areas for sulfur
3. Identify two major human activities influencing the sulfur cycle.